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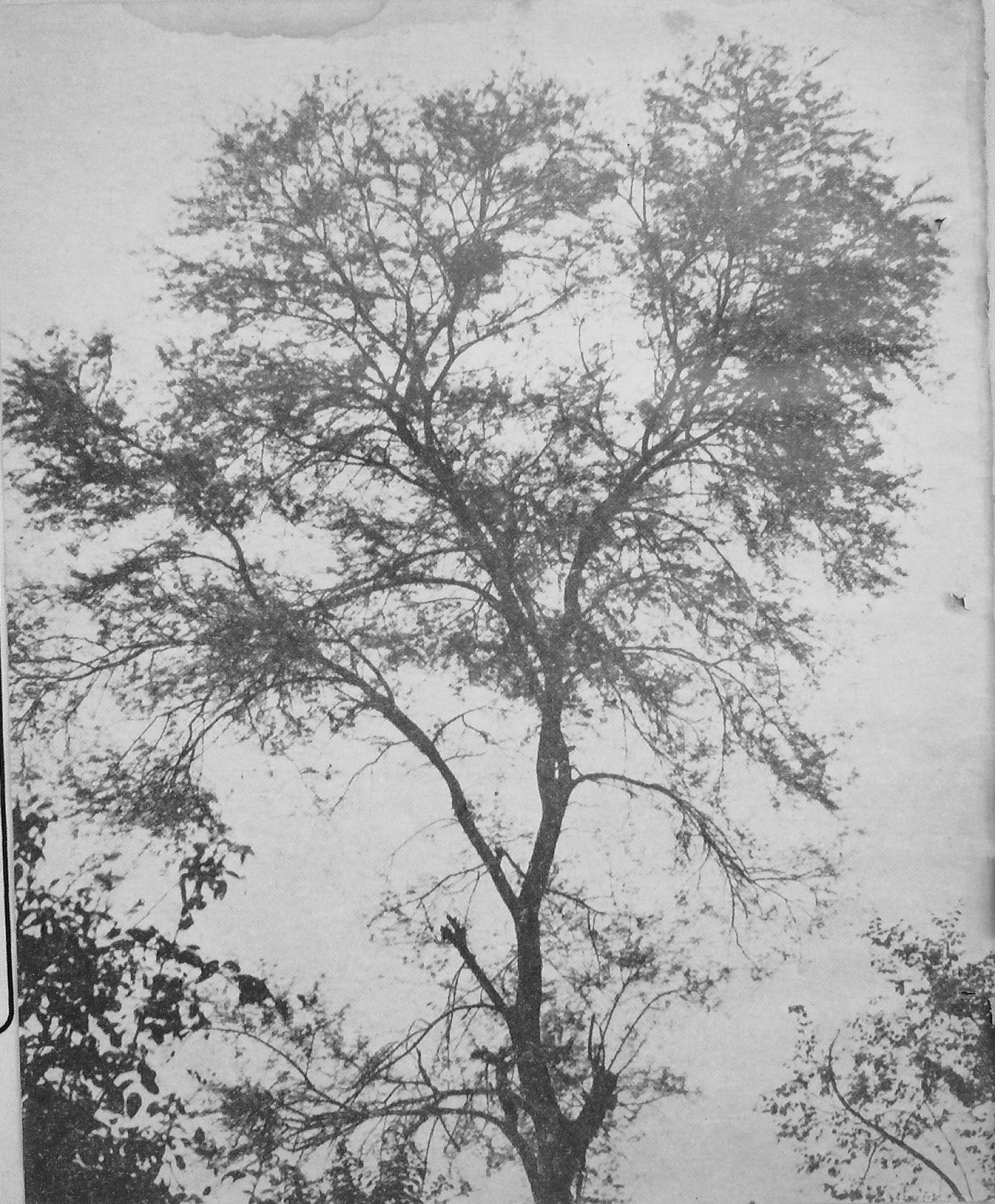
# Intensive Agriculture

OFFICE OF THE PRINCIPAL, RURAL EXTENSION TRAINING CENTRE
15 JAN 1964

DECEMBER 1963



# Intensive Agriculture

VOLUME 1, No. 10 DECEMBER 1963


THE PICTURE ON THE COVER

This Mandi farmer is all smiles at the way his well-fertilized potato crop is coming up—a scene cne often comes across in Mandi now. For under the Indo-German Agricultural Project, agricultural production in Mandi District in Himachal Pradesh is on the increase at a fast pace.

*—Photo by J. H. Gwildis*

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Price: 50 nP.
Annual Subscription : Rs. 5.50

# TREES ARE OUR WEALTH

*Speaking recently at the Silver Jubilee of the Forest Research Laboratory, Bangalore, and at the Annual Convocation and the Golden Jubilee of Southern Forest Rangers' College and Research Centre, Coimbatore, Dr. Ram Subhag Singh, the Union Minister for Agriculture, emphasized the need for intense research on the utilitarian aspects of forestry.*

OUR forest area is a small—22 per cent of the land surface—and our population is large. The annual per capita consumption of industrial wood in our country is as low as 0.7 cft., compared to 19.4 cft. in Japan, 42 cft. in U.S.S.R., 22.4 cft. in U.K., 59 cft. in USA and 15.5 cft. for the entire world. We have, therefore, made a provision of Rs. 13.31 crores in the Third Five Year Plan for raising plantations of various kinds of useful species on 8,37,500 acres.

Not only have we to increase our forest area by afforestation, but we have also to put available species of timber and other forest produce to the best possible use. To achieve this purpose, it is extremely important to carry out intensive research with an eye on the trends of modern development, and with a view to meeting the growing demands of the industry and various other users of raw material from the forests. The utilization of forest products is thus an important field of research. This must gain more momentum in all the fegions for more complete and more rational utilization of the inadequate resources at present at our disposal.

We obtain innumerable products from forests. And investigations into the same are bound to yield fruitful results. As in the forests of the eastern region, there is a great variety of species in the forests of the southern region too. Amongst them, there are three important trees which have earned world fame, namely teak, sandal and rosewood. The last two are at present exportable commodities and bring in large amounts of foreign exchange. And if the southern region develops its teak forests and expands their area instead of continually sacrificing forests for other purposes, as is most glaringly happening in Kerala, we should be able not only to meet our internal requirements but also produce another commodity of great export value.

Our ancestors did appreciate the value of trees and forests. Even the Rig Veda invokes the blessings of trees :

वनिजो भवन्तु शं नो ।

In the Atharva Veda occurs the following :

दशवृक्ष मुञ्चेमं रक्षसो ग्राह्या
अधि यैनं जग्राह पर्वसु ।
अथो एनं वनस्पते जीवानां
लोकमुन्नय ॥

And they knew that not only did trees produce timber, but offered a variety of raw material for human use. We have lost much of our forest lore. We have now to use the tools of modern science to bring to light the hidden wealth of our forests.

I cannot imagine any line of investigation that is likely to yield more fruitful results than research into forest utilization. While on the one hand we have to conserve our existing forests from further deterioration and destruction, and build up additional sylvan resources, we must also ascertain how far we can put our existing resources to present use without diminishing their volume and value for future generations. The advantage of an asset like the forest is that with

prudent use and wise management, its products can be obtained at a steady pace in perpetuity. All that I would suggest is the greater attention to the utilitarian aspects, for which, indeed, such laboratories are meant.

In our ancient writings there were various references to the importance of tree-planting. For example in the Shiva Puran it was said :

अतीतान् आगतान् सर्वान्
पितृ वंशास्तु तारयेत्
कान्तारे वृक्षरोपीयः
तस्माद् वृक्षास्तु रोपयेत् ।।

The love for trees has always been there and we should now utilise this to make people not only tree-conscious but forest-conscious. That is, we must train them to treat the forests with the same reverence as they do individual trees, making them realize the magnitude of the benefits involved for the present as well as for the future generations.

I might here also make mention that in certain parts of India, there are small groups of forest trees which are regarded as sacred and which the local people do not cut. They are called Devasthans in Bihar and Bengal, and Ovans in Rajasthan. Probably other States have also similar sacred groves. These, however, are small remnants of once large forests; each grove is about a few acres in extent, often even less than one acre. Still, the idea is there, that there is something sacred about forests, and we may in time hope to revive it on a large scale so as to help in protecting our bigger forests which are under Government management, and which are the real reservoirs of timber for meeting the requirements of the Railways, Defence, Industry, etc.

As you all know, the existing forest wealth of our country is inadequate to meet our present needs. Our industries are growing and our standard of living is gradually rising. We shall require a very much larger extent of forest to meet our future requirements. During the Third Five Year Plan, we have provided Rs. 10.56 crores for raising plantations of various economic species on 7 lakh acres; in addition we have a scheme, with cent per cent Central assistance of Rs. 2.75 crores for raising plantations of quick-growing species on 1,37,500 acres.

# A ROSEWOOD LOG FETCHES Rs. 56,400

*A single rosewood log, recently exported to Switzerland, fetched a record price of Rs. 56,400 at Ernakulam, Kerala, it is reported.*

*The log was of extraordinary length and girth and free from any blemish.*

*India and Brazil are the two main rosewood-producing countries. But Indian rosewood is rated higher because of its quality and size.*

# SAMBALPUR ADOPTS PACKAGE PROGRAMME IN RIGHT EARNEST

279
25
304

By
T. R. RAO
Farm Information Unit
Directorate of Extension
*New Delhi*

HIRAKUD means, 'heap of diamonds'. Though one may not see any precious stones around Hirakud in Sambalpur District, Orissa, farmers there are now producing more grains to the acre and that is certainly more precious to our people than diamonds. The Hirakud Project has come to the aid of the farmers in producing more food by providing water for irrigation.

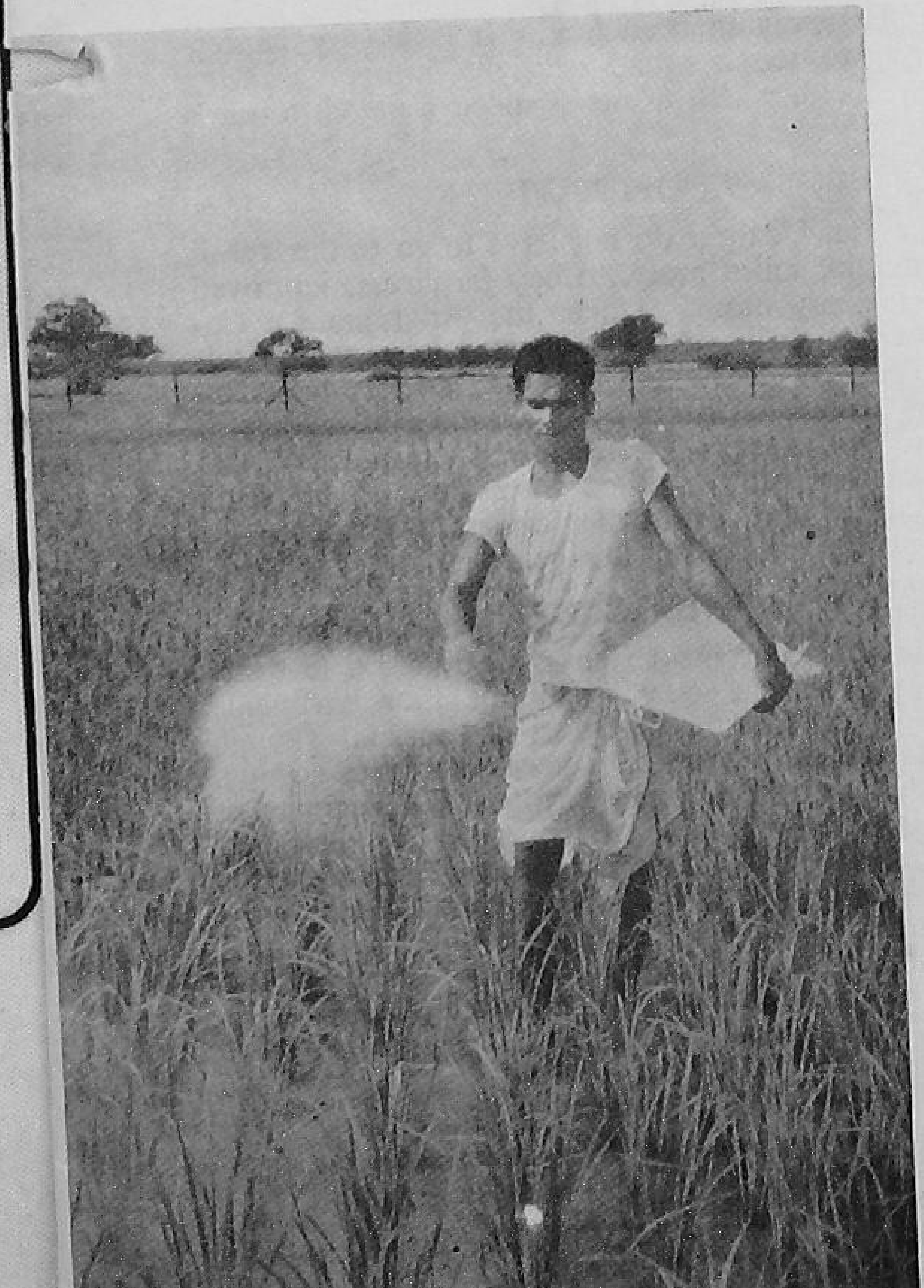
Farmers in Sambalpur District were not used to irrigation. When the Hirakud Project provided irrigation facilities, very few of them came forward to make use of the same. But once the Intensive Agricultural District Programme was started in the District things changed very quickly. The Extension officials did not find it very difficult to convince the farmers about the benefits of irrigation as the irrigated fields

Udaipur farmers in Sambalpur District use improved agricultural practices—line-sowing which makes weeding and intercultivation with Japanese push-hoe easy, and top dressing with ammonium sulphate—a sure way to bumper crops

*Weeding*

*Intercultivation*

*Top-dressing*



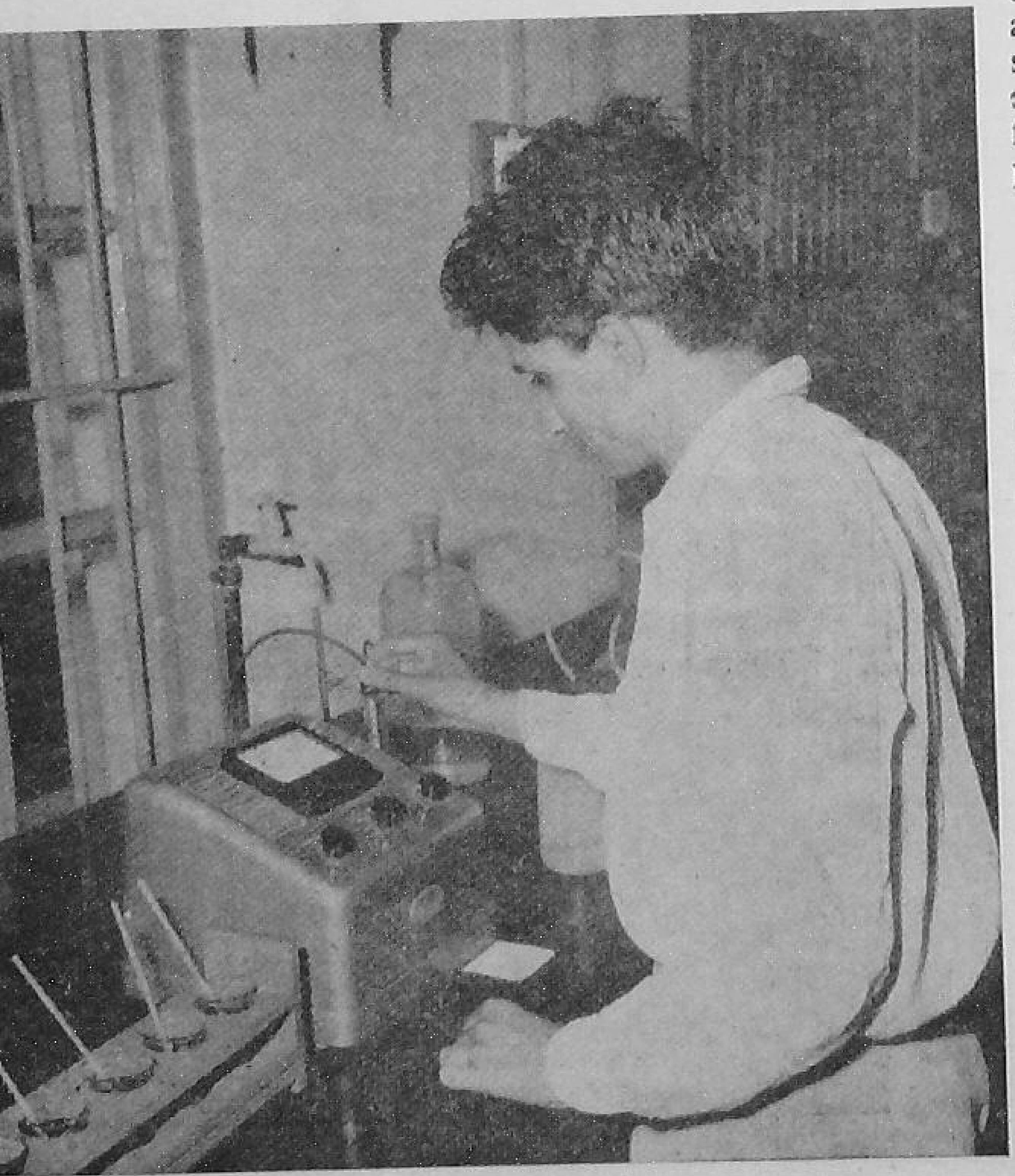
yielded almost double.

Sambalpur District is one of the eight additional districts selected for Intensive Agricultural District Programme, popularly known as Package Programme. The Programme which was started in 1962 has already made its impact on the farmers as well as on the average yield. People in the District, particularly the Extension officials, are confident that the agricultural production of the District will be doubled within the next three years. The change in the attitudes of the farmers and in the pattern of agriculture is very apparent even to a casual observer. The villages of Sambalpur District are undergoing a great agricultural revolution. The story of Udaipur farmers will bear this out.

## UDAIPUR SHOWS THE WAY

Udaipur village is situated in the interior of Budan Block of the Sambalpur district. About 116 families live and farm in Udaipur, but their methods of cultivation were very primitive. As such their yield of paddy per acre could never cross the 10-maund mark. With the advent of the Package Programme in the last *rabi* season the shape of things changed. The farmers adopted improved practices such as use of fertilizers, irrigation and pesticides. The results were very encouraging. Many farmers got 25 maunds of paddy per acre. Farmers like Gaurangadas and Yudhishtar Danta were able to get even more than 35 maunds of paddy per acre. This is only the beginning. They are so convinced of improved practices that they are confident of producing much more in future years.

*More and more farmers are coming forward to get their soils tested*



## USE OF FERTILIZERS

In the *rabi* season of 1962-63, the farmers of this village used about 15,000 Kilograms of fertilizers. The results were so convincing that for the *kharif* almost all the 116 families have already 'lifted' more than 30,000 Kgs. of fertilizers and have applied it to their *kharif* paddy.

All the farmers have used improved seed, have raised their nursery by the improved method and have transplanted the *kharif* paddy in lines. Out of the total area of 563 acres under paddy about 375 acres have already been sprayed and dusted against pests and diseases.

The farmers today have 15 rotary weeders and they are using them to the best advantage.

The entire paddy seed was treated before sowing with organo-mercurial compounds to protect the crop from foot-rot disease. The gall fly, which is one of the deadliest enemies of the paddy crop in this area is also being taken care of. The farmers have formed squads for spraying pesticides. It is a very impressive sight to see a squad of eight farmers spraying field after field, which to me signified a march towards progress.

## COOPERATIVES

Farmers of Udaipur do not have to go to the Tehsil Headquarters, miles away, to buy fertilizers, improved seeds, etc., any more. Under the programme a Co-operative Society has been organized in a nearby village. They get everything from the Society including the credit which is in reality a basis for all efforts to improve agriculture. Twenty three farmers of this village have already enrolled themselves as members of the Society and rest of the farmers are expected to follow suit by the end of this year.

## NEW CROPS

On the advice of the Extension workers a few farmers of this village grew groundnut after harvesting their *rabi* paddy for the first time last season. Though the yields were not very high because of late sowing, the farmers were able to get nearly 500 Kilograms of groundnut pods per acre. Encouraged by their first attempt many of the farmers are now preparing for taking a groundnut crop in rice fallows in the forthcoming *rabi* season. To avoid the difficulty of procuring good quality seed from outside, some of the farmers of this village like Yudhishter Danta have raised groundnut crop in this *kharif* season for seed purposes.

*This farmer is multiplying TMU groundnut under the Seed Multiplication Scheme—the first time that groundnut has been grown in the District*

Cash crops like jute and potato have also been introduced into this area. The extra profits from cash crops have caught the imagination of the farmers and more and more are coming forward to take up the cultivation of these new crops for bringing prosperity to their families and the village.

What is true of Udaipur is also true of the other villages in the 15 Blocks of Sambalpur District where farmers are joining the Package Programme in ever greater numbers. The Intensive Agriculture District Programme has been successful in showing the right way to the farmers to improve their agriculture and economy and they are already on their march ahead.

# Choose right VEGETABLES for your KITCHEN GARDEN

By
L. VENKATARATNAM
Deputy Director of Agriculture
Hyderabad, Andhra Pradesh.

In villages and in towns, the idea of kitchen garden is fast catching the attention of everyone. More and more housewives are taking interest in the growing of vegetables in the backyards to meet the family needs.

In fact, an urge to produce a vegetable or a fruit crop from the backyard had always been there. In villages, one found the roofs and haystacks utilized for creeper vegetables, especially gourds of different kinds. In a few other places as in peninsular India, one could see ananas, tapioca and coconut growing luxuriantly in the backyards.

Similarly in the lower Himalayas and in the plains of north India, papayas, gauvas, *sem* made up the backyard kitchen garden.

But as no systematic pattern was followed, these gardens failed to meet the daily needs. The first step in making a kitchen garden yield round the year and in sufficient quantities lies in the choice of vegetables.

The list of the vegetables fruits you can grow in a kitchen garden can be a big one. Grow only those vegetables or fruits which are most suited to your backyard and also suited to your taste. It is no use growing all sorts of vegetables and unnecessarily overcrowding the kitchen garden. Grow only three to four kinds which can stand long in the field and keep the kitchen going with their supply.

Drumstick, *poi*, spinach, tondli and *sem* are both nutritive and hardy. See how these five vegetables covering just about 200 square feet area can ensure round-the-year supply for a family of five.

| *Vegetable* | *Duration* | *Yield in kgs.* |
|---|---|---|
| Drumstick | Sept-Oct. | 100 |
| *Tondli* | Jan-August | 75 |
| *Poi* (Creepitg spinach) | Round-the-year. | 50 |
| Ceylon spinach. | Round-the-year. | 50 |
| *Sem* | Feb-August | 25 |
| | | 300 |

*Bhindi* and tomato are the vegetables which everybody likes and should be included in every garden. In the past, even farmers have met with disappointment in growing these two vegetables, as both these are subject to virus diseases. But with the release of *Pusa Sawani bhindi* and *Pusa Ruby* tomato, this is no problem, for these are virus-tolerant varieties.

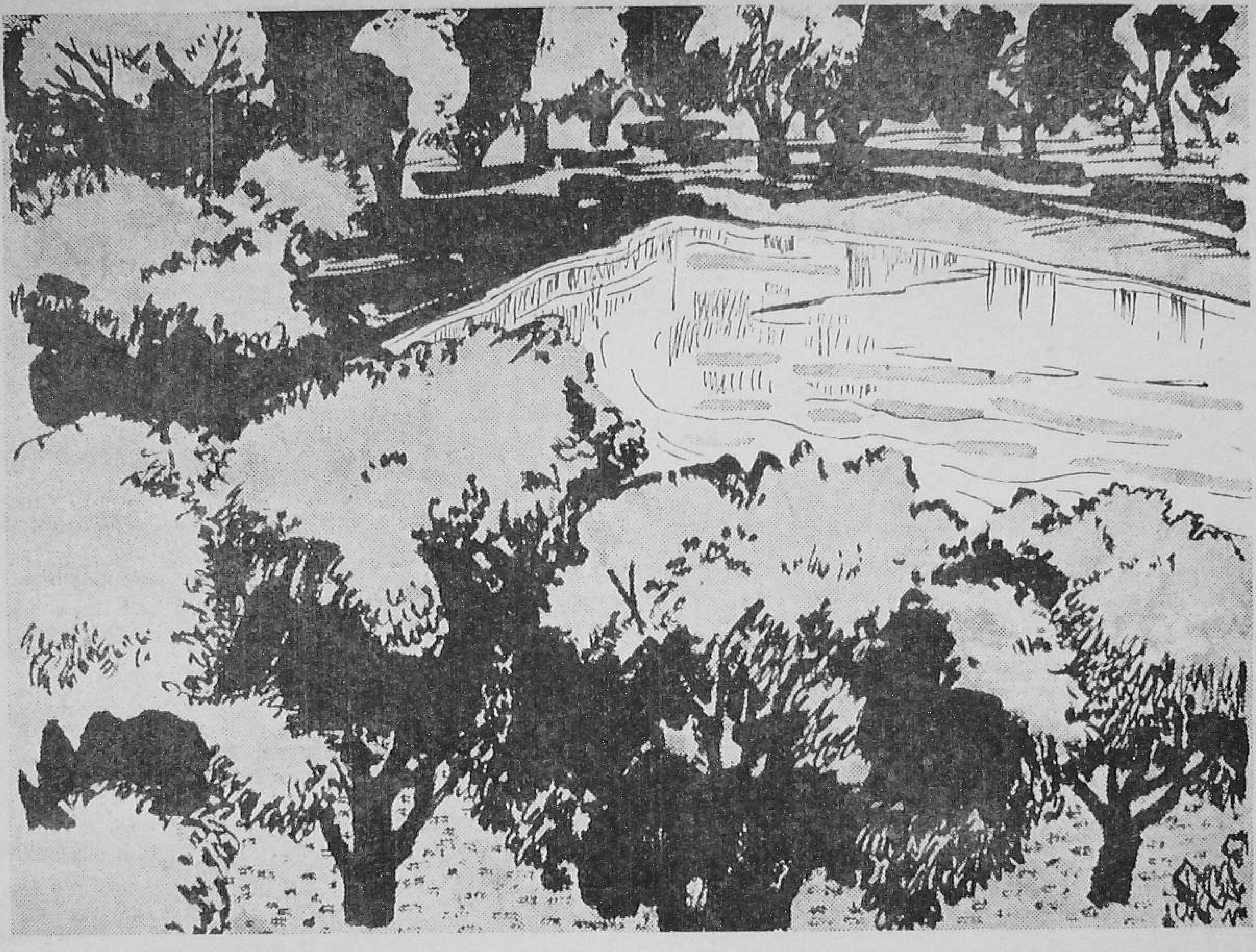
*Pusa Sawani* yields tasty slender green pods and *Pusa Ruby*, a semi-dwarf variety, is very dependable. For the winter crop of tomato, select *Sioux* variety.

You will surely like to grow peas and cauliflower. Grow them but select good varieties.

Amongst the pea varieties, *Early December* from the Agricultural Institute, Gwalior is the newest. It gives sweet richly-flavoured green peas within nine weeks of sowing. Dwarf and vigorous, it should be sown close to match the bumper late-yielders like Bonneville peas.

If you cannot grow peas, you can easily grow cowpeas. They grow with the least trouble. *Type* 2 of Kanpur and *Sirsa I* of the Punjab can stand both the hot summer and the monsoon showers. They will creep and cover the land, enrich it with their leaves and give long tender tasty pods.

Potatoes do not generally find a place in kitchen garden, as they are liable to rat and virus attack. But you can try virus-tolerant *P.S. 194* which is an attractive golden skinned variety that can grow during *rabi* both in the North and the South.



# Tank-beds can provide MANURE, FODDER and FUEL

FOR more than six months in a year, most of our tank-beds remain entirely or partially dry. For example, in Madras State alone, this is true of as many as 27,000 tanks, which are full for not more than six months a year.

The beds, when dry, present an arid appearance, and offer an ideal ground for raising certain crops which yield green manure, fodder and fuel.

During the present emergency when we need to utilize every bit of land for increasing agricultural production, we cannot afford to leave these lands unused.

Besides, there are several advantages of growing shrubs or raising trees in tank-beds.

*The trees and shrubs can supply some of the commonly needed products such as fuel, fodder and green-leaf manures;

*The growth of trees all round the bunds will strengthen them;

*With trees all round the bunds, the velocity of the wind gets reduced. This will indirectly reduce the loss of water by evaporation;

*Every tank-bed, when planted to trees, can form pockets of wooded land for shade for the villagers and cattle during the summer months;

*This will indirectly help in the multiplication of birds of the area and also the natural fauna to some extent.

## MADRAS TAKES THE LEAD

The Madras Agriculture Department has suggested to farmers the following recommendations for growing shrubs and raising trees in tank-beds.

### *Planting Methods*

It is difficult to recommend any single system of planting for all tank-beds. Some of the tanks may be deep and the water may remain in such tanks for longer periods making it difficult for any tree or plants to come up. Again the soil condition of different tanks will require different species to be planted.

You should make plantings far away from the sluice gates and also from the inlet canals. The places where you can plant are : on the tank-bund itself; on the sides of the bund; on the raised sides of tanks away from the water-shed.

You can as well take short-term crops in the bed itself as the water dries up.

### *Plants on the Bund*

You have to select from those species which are suitable for planting along the footpaths or cart-tracks.

For big bunds, you can choose trees like the following : *Pongamia glabra* (Pungam), *Ficus religiosa* (Peepul, Arasu), *Albizzia lebbeck* (Vagai), *Enterolobium saman* (Rain tree), *Glyricidia maculata* (Ceylon vagai), *Mangifera indica* (Mango), *Syzigium jambolanum* (Naaval), *Tamarindus indicus* (Tamarind) *Thepesia populnea* (Poovarasu), and *Terminialia arjuna* (Vella marutham).

If the bund is narrow or small, plant smaller trees such as :

*Glyricidia maculata, Thespesia populnea, Acacia arabica* (Karuvelam), *Acacia leucopholea* (Velvelam) and *Bassia* species (Illuppai).

Plant these on one side of the bund, towards the outside. On such narrow bunds you can very well grow palmyrah and coconut.

### *Plants on the sides of the bunds*

On the outer sides of the bunds, which are generally slopy, it is better to grow dense shrubs or grasses which will form good clumps. They will bind the soil, and at the same time give either green-leaf manure or fodder.

Grow such green-leaf manure plants as :

*Adhatoda vasica* (Adathodai), *Leucaena glauca* (Nattu caavundal), *Ipomea carnea* (Poovarasu-kodi), *Sesbania speciosa* (Seemai Agathi) and *Glyricidia maculata.*

Even in poor soils, the common green-leaf manure plants such as *Calotropi gigantea* (Erukku), *Jatropha* species and *Cassia* species come up well.

### *Fodder grasses on slopes*

Fodder grasses which you can grow on the slopes are : Australian grass, blou buffel, Kolukkattai grass. etc.

These grasses will form good clumps and their fibrous roots will hold the soil and protect the bunds from erosion. They can withstand the adverse conditions very well. You can cut and sell these or allow cattle to graze in a regulated manner.

Nerium, Tecoma, Thevitia, Tabernaemontana, etc., will beautify the area and at the same time give flowers which will be useful in villages.

### *On the raised side of the tank-bunds away from the water shed*

Since these areas are likely to have water only for shorter periods than the water-shed area, you can easily raise trees when the water recedes. In six to eight months, these plants will establish and grow to a stage when stagnation of water for a few months will not affect or kill them.

*Acacia arabica* (Karuvel) is the ideal species for such plantings. Palmyrah may be planted on the mounds. *Prosopis juliflora, Acacia* Species like *Pongamia glabra, Bassia* species, *Ficus glomerata, Pithecolobium dulce, Odina wodier, Syzigium jambolanum, Thespesia poulnea, Hibiscus tilaceus* and *Terminelia arjuna* are the other species which will come up under such conditions.

### *Short-term crops grown in the bed itself as the water dries up*

Take short-duration fodder crops like maize or *cholam* combined with legumes like *Crotolaria juncea* (sunnhemp) and cluster-beans.

You can sow green manure plants like *dhaincha* (*Sesbania aculeata*), indigo (*Indigofera* species)

(*Turn to page* 28)

# SNAKE-GOURD

*At the Gramsevak Training Centre, Samalkot, Andhra Pradesh, snake-gourd is popular for two good reasons—for its high returns and its availability almost all the year round. Perhaps you too may like to grow it.*

*By*

P. B. SRIRAMCHANDRA MURTY
and
C. R. G. K. SASTRY

SNAKE-gourd is a vegetable that can be grown almost throughout the year though it has two main growing seasons *i.e.* June to November and December to March-April.

A well-drained medium soil is the best for snake-gourd.

## SOWING

Dig two cubic feet each basin, at a distance of six to eight feet either way. Fill up the pits after digging with a mixture of the dug-up soil and well-rotten cattle manure.

Green Long and White Long are the best varieties. Dibble two to three seeds in each pit. You will require about one to one and a half pounds of seed to plant an acre.

## AFTERCARE

Water regularly in the evening till the seeds germinate. After the seeds have germinated, you need water only once in two to three days.

In about a month or a month and a half, the vines grow up to the *pandal* or bower height.

Attend to weeding and hoeing both in and around the basins. This also helps in checking the spread of pests and diseases.

As and when the gourds form, tie a string to their hanging end with some dead weight (preferably stones) so that they grow long without any curs.

## TRAINING

Stake the growing vines so that these can reach the *pandal*. You can make a *pandal* with cheap material like bamboos alround and with coir rope in the centre woven like a net.

See to it that all the vines are trained on the *pandal* and not hanging outside as this will hinder the full growth of the gourds.

## MANURING

Snake-gourd responds well to manuring. Apply two to three baskets of cattle manure as a basal dressing in each of the basins at the time of planting.

Twenty to 25 days after sowing, give the first dose of ammonium sulphate or preferably a manure mixture containing nitrogen and phosphoric acid at the root zone at the rate of half an ounce per vine (basin). Give similar three or four doses at about 15 to 20 days intervals during the entire period of cropping.

The fruits will grow six to seven feet long with a 1½ to 2-inch diameter at the centre.

## PESTS

There are only two pests and no disease on snake-gourd.

*Snake-gourd semilooper* : This is a slender, green, long caterpillar with white longitudinal stripes on the body. It feeds on the leaves and young vines, and often affects the plants very badly.

*Fruit flies* : The fruit fly deposits eggs on the tender fruit by piercing into the fruit pulp. The maggots that emerge bore into the fruit pulp and cause rotting of the entire fruit. The pest is more serious in the rainy season crop than in the crop planted in November-December.

*Control for both* : Spray Endrin 0.03 per cent (1 oz. of Endrin in 4 gallons of water of 20 per cent concentration). Lindane 0.01 per cent also can check both the semilooper and the fruit fly.

## YIELD AND ECONOMICS

With these cultural and manurial practices, an yield of 850 kilograms was obtained from an area of 1/10 acre at the Centre.

This was sold for Rs. 102 (at 12 naye paise per kilogram). In addition to this yield, two kilograms of seed was also extracted which was sold at the rate of Rs. 32 per kilogram.

And all that was spent was only Rs. 63 towards the cost of *pandal*, manuring and labour etc. Hence, per acre yield for one crop works out to 8,500 kilograms or 8.5 metric tons which will fetch Rs. 1,200 for the fruits in addition to 20 kilograms of seed which can be sold for Rs. 640.

Growing two crops of snake gourd means an income of over Rs. 3,500 from an acre.


NOW'S THE TIME TO

# GROW MORE Vegetables and Fruits

**The following publications will be useful to you in growing more vegetables and fruits :**

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| Fruit nursery practices in India | Rs. 2.25 |
| Growing vegetables in home gardens of Delhi | 50 nP. |
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| Grape culture in India | 50 nP. |
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WEEDS can be the most stubborn enemy of your sugarcane crop; for unlike many other crops sugarcane is a very slow germinator and appears much after the weeds have established themselves.

There is another reason why weeds grow unchecked and seriously compete with the young sugarcane crop for food, moisture, light and space : it is the large spacing given to the crop rows.

A large variety of weeds infest the cane fields. *Untchara, jungli* jute, *jungli* rice, *kahundra, itschit, nuni gokhru, suffed murgha* and *hazardana* among the annuals, and *motha* and *dub* among the perennial ones are the most important weeds.

You can control annual weeds at least partially by cultural methods. But this is not possible in the case of perennial weeds, because perennial weeds multiply by their underground parts also which are difficult to uproot by ordinary implements used for cultivation.

Hence, when you intercultivate the sugarcane crop, it has no effect on these weeds. Also, this is only partially successful as the weed plants near the crop escape. They set seed and infest the field again.

By hoeing, you can destroy the germinated and the germinating weed seeds for the time being. But those weed seeds which are buried deep, come up to the surface during cultivation operations and produce a new weed crop. Weeds like *motha* and *dub* take just a few days to come up again. Apart from that, hoeing may even help these weeds to spread !

Besides, hoeing and weeding are costly and laborious. And then it may not always be possible to undertake cultural operations at the right time due to unfavourable weather conditions.

Here is where chemicals can come to your help. But these alone also are not sufficient, hence you

# THE TWO-WAY ATTACK TO KILL CANE WEEDS

should combine cultural operations with these chemicals to completely control the sugarcane weeds.

The sugarcane takes 15 to 20 days to emerge. A large number of weed seeds germinate during this period. You have to destroy these before they start competing with young sugarcane plants.

Therefore, give a pre-emergence spray of 2, 4-D about 10 days after the crop has been planted, at 2 pounds of the chemical in 60 gallons of water.

Next, give two to three hoeings at intervals of about three weeks or after each irrigation. Give the first hoeing when the crop is about six weeks old.

Earth up the crop with the first rains. This will not only give support to the growing plants but will also control the weeds.

Within a month of the earthing, give another spray of 2, 4-D at the same rate. This will destroy all weeds which have come up after the rain and will also prevent the growth of *motha*.

These combined operations will ensure a complete weed-free sugarcane crop.

# THERE IS A 'PACKAGE OF PRACTICES' FOR COCONUTS TOO

By
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*Rehabilitating the existing trees by adequate manuring, better cultural practices, timely protection measures together with planting new areas with coconuts and under-planting the existing gardens where the trees have become unproductive due to age and diseases are the key points in the 'Package of Practices' for coconuts in Kerala.*

RAISE a suitable green manure crop in the field. On the West Coast, wild sannhemp is the best green manure crop. Sow it in April-May, using a seed-rate of 20 to 25 pounds per acre. Plough it under by the last week of August.

Also add superphosphate or bonemeal at the rate of one kilogram per tree before sowing the seed. Mix it thoroughly with the soil.

In small holdings, where a green manure crop cannot be raised in the field, grow quick-growing green manure bushes like glyricidia along the borders of the garden.

Apply the glyricidia leaves in basins dug around the base of the trees at the rate of 50 to 100 pounds per tree.

## ADD FERTILIZERS TOO

Apply potash in the form of muriate of potash at the rate of two to three pounds per tree per year at the time of applying the green manure.

Also apply superphosphate or bonemeal at two pounds per tree per year if the same has not been applied at the time of sowing green manure seeds.

On the West Coast, fertilizers can be applied in the form of a coconut mixture at seven pounds per tree per year.

The suitable mixture for sandy areas will be in he ratio of 8 : 4 : 16 and for other tracts 8 : 8 : 16.

Apply the fertilizer mixture in basins dug around the base of the trees in September.

Apply only half the dose of the above manures to two to three-year old palms.

## INTERCULTIVATE YOUR GARDEN

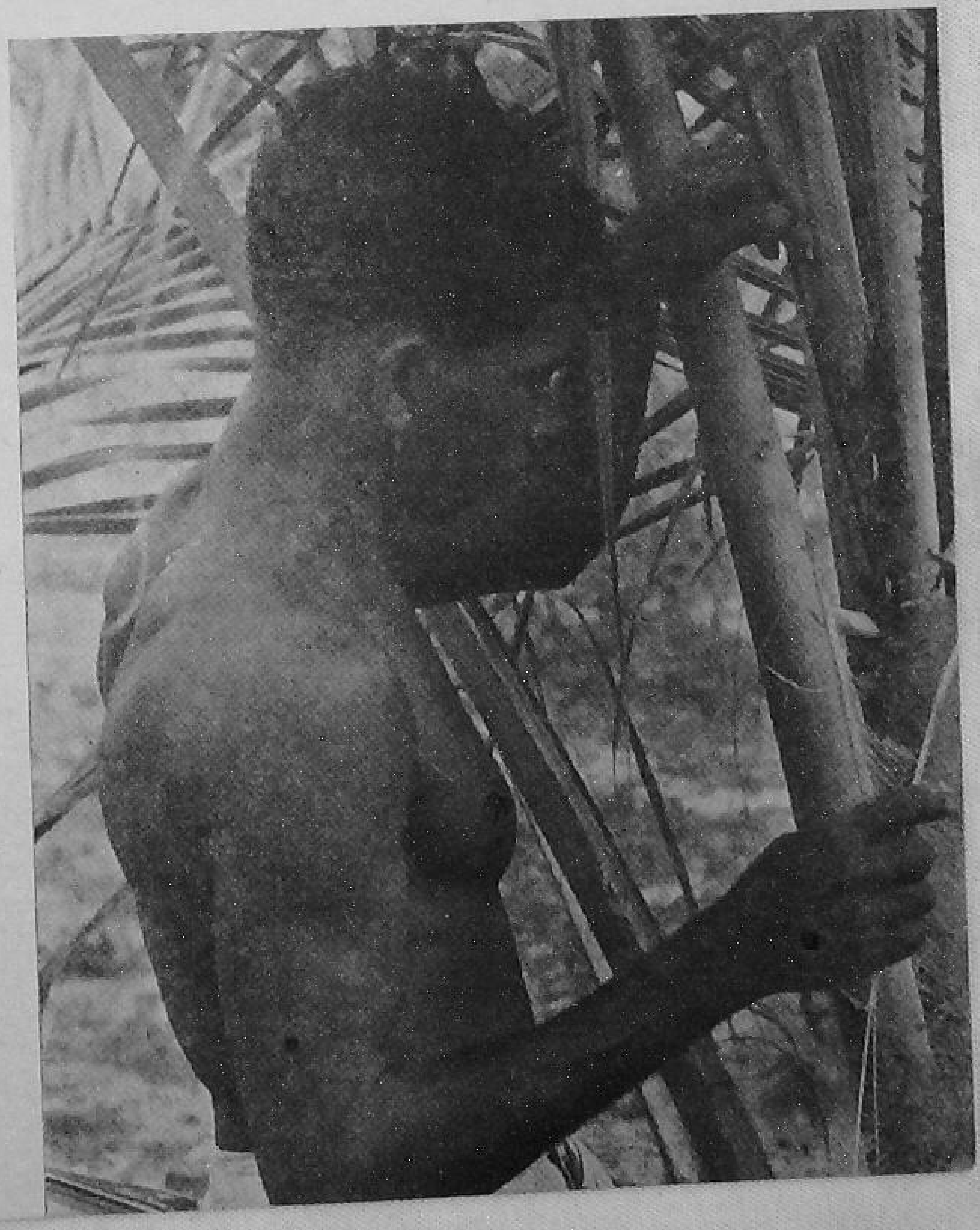
Intercultivation in coconut gardens improves the yield of trees to a great extent. Dig with a *mammatty* or plough regularly.

Dig with *mammatty* or plough regularly the coconut garden.

Give two or three ploughings or diggings during the rainless months to check the weed growth and to conserve soil moisture.

*Choose good, vigorous seedlings* (just like the one on the right)

*Hook that rhinoceros beetle, the serious enemy of the coconut palm*



*Year-old coconut seedlings carefully packed for despatch to distant places*

## IRRIGATE COCONUTS

Irrigate your garden regularly during the rainless months. This will make the coconut trees yield more.

In the coastal sandy areas on the West Coast, you can use sea water for irrigation.

Do not use sea water in heavy soils.

Instal filter point wells in coastal sandy areas.

## CONTROL PESTS AND DISEASES

The rhinoceros beetle is a very serious enemy of the palm. Follow these measures to get rid of this pest :

Extract and destroy the beetles with beetle hooks.

Fill the leaf axils with a mixture of sand and BHC 10 per cent in equal proportion.

Spray manure pits, compost pits and other breeding places with 0.1 per cent BHC at intervals of 2 to 3 months.

Other serious pests of the coconut palm are the black-headed caterpillar, the red palm weevil, the cock-chafer grub, etc.

For the control of the black headed caterpillar, spray the trees with 0.2 per cent DDT. Getting predators and parasites released on your palm is another effective measure.

For controlling the red palm weevil, inject the trees with 1.0 per cent solution of Pyrocone E in the early stages.

Ploughing BHC 10 per cent at 56 pounds per acre controls the cookchafter grub effectively.

Spray trees regularly against the common diseases.

To check stem bleeding, a common disease of coconut, scoop out the affected part and smear hot tar or Bordeaux paste.

Contact the plant protection workers in your area for necessary guidance and advice.

## PLANT COCONUTS IN UNECONOMIC PADDY LANDS

In Kerala, the acreage under coconuts can be increased by utilizing the uneconomic paddy lands subjected to water-logging.

Raise small mounds in regular rows, 20 to 25 feet apart.

Each mound should be at least two feet high above the water level during the monsoon.

Plant coconut seedlings on such mounds. Make the mounds larger progressively. Fill up the space between the mounds in one line in the course of a few years.

Instead of mounds, you can construct road bunds about 15 to 20 feet wide and about 30 feet apart and plant seedlings on two sides of such bunds.

Coconuts can also be planted on wider bunds of productive paddy fields.

## RECLAIM LAKES FOR COCONUTS

Reclaim shallow lakes and backwaters and plant coconuts there.

Raise narrow bunds in the shallow regions of the the lakes with the clay deposit removed from their bottom.

Fortify the bunds by dumping in paddy straw, dry grass, green leaves and coarse sand in alternate layers with the soil.

(*Turn to page* 28)

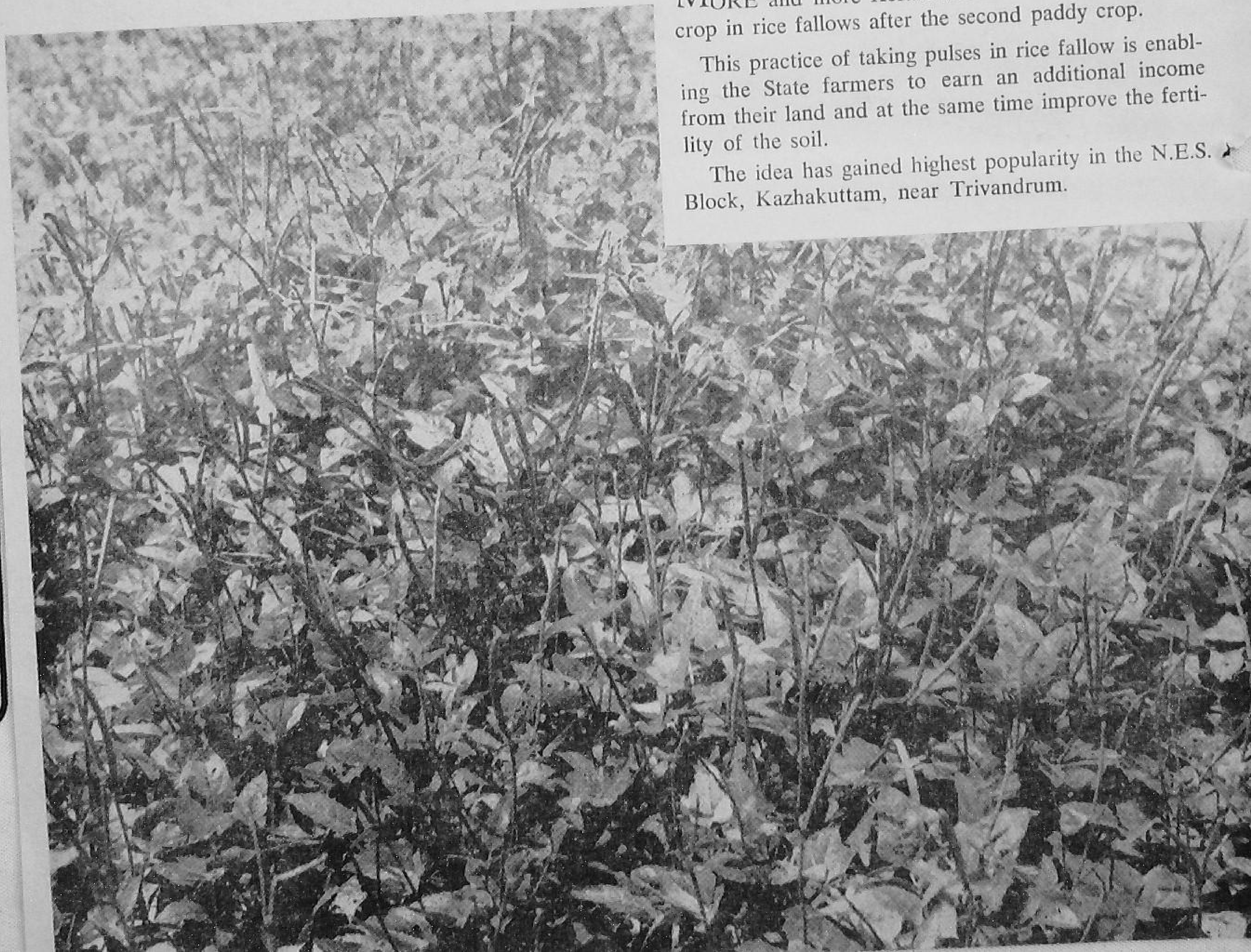
By R. HALI
Editor, 'Kerala Karshakan'
Trivandrum

# Try **pulses** in RICE FALLOWS

MORE and more Kerala farmers are raising a pulse crop in rice fallows after the second paddy crop.

This practice of taking pulses in rice fallow is enabling the State farmers to earn an additional income from their land and at the same time improve the fertility of the soil.

The idea has gained highest popularity in the N.E.S. Block, Kazhakuttam, near Trivandrum.



*The pulse crop after the second paddy crop not only brings additional income to the farmer but also makes the soil richer*

In this area, paddy forms the one and the only cultivated field crop. Four thousand acres are cropped twice every year for growing paddy. The practice—prevalent in the past—was to allow the paddy fields remain fallow for more than three months after the harvest of the second crop.

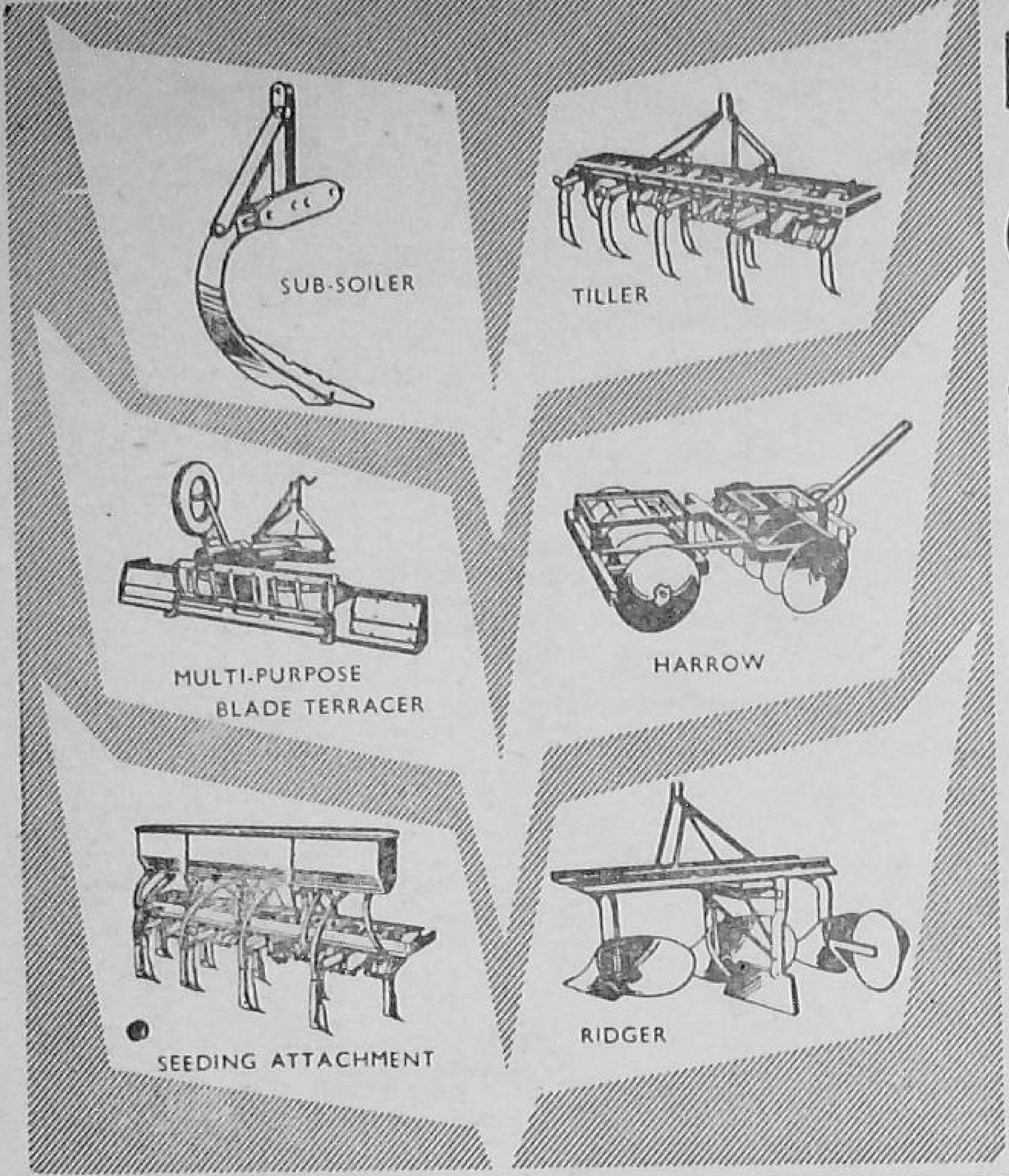
But the constant efforts of the Extension workers have changed the scene altogether. Now growing pulses after paddy has become a popular practice in almost all the fields where enough moisture is available. White, black and green grams are the common varieties cultivated. But white gram is more popular as it requires only 60 days to mature.

The cost of cultivation is about Rs. 75 per acre. The average yield per acre is worth Rs. 180—a profit of Rs. 100 within the short span of about two months, from an acre of land.

This year, out of the 4,000 acres of rice fallows, a than 2,000 acres were utilized for growing pulses. In Kadinamkulam, a panchayat within the Block, the entire 273 acres of rice fallow have been transformed into a pulse garden.

Trials have shown that application of a mixture of superlime potash increases the yield of pulses by 40 per cent. Demonstration plots which received the above treatment have already earned a reputation among the farmers.

It is estimated that out of the 19 lakh acres under paddy in Kerala, 8 lakhs can be utilized for growing pulses as a third crop.

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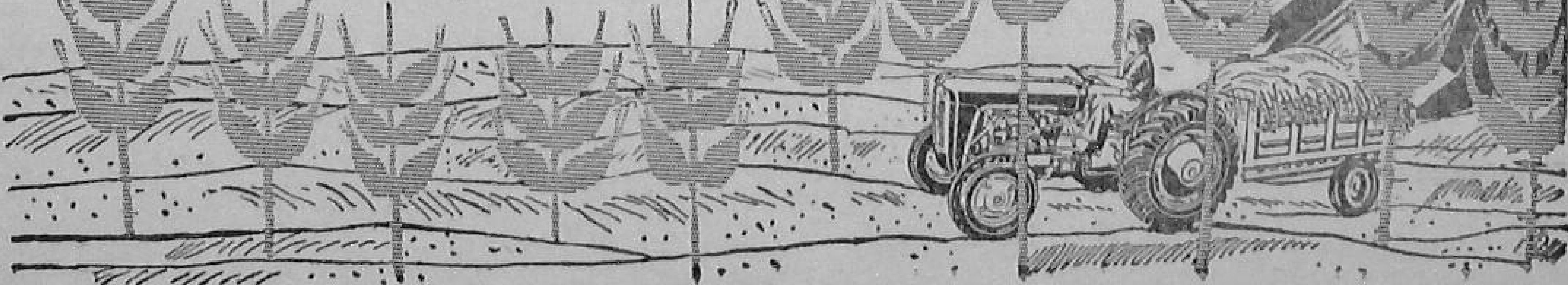


# Now Possible Crops Round-the-year in West Bengal

By
K. SENGUPTA
Joint Director of Agriculture (Extension)
and
M. K. DAS
Farm Manager, Seed Multiplication Farm, Fulia
West Bengal

FOR long, the cropping pattern in the eastern region of India has almost wholly depended on the monsoon. From June to September, when the rainfall is heavy, rice is the universal crop. During the dry season from November to May, in the absence of adequate irrigation, cereals, pulses and oilseeds are grown where there is sufficient residual moisture in the soil.

But now all this is fast changing. More and more tube-wells are coming up and a large number of pumping sets to pump water from rivers have been fixed.

This means irrigation is becoming possible all the year round. And when the water is available throughout the year, you can make full use of your land during each of the three recognised seasons *viz.*, monsoon (hot and wet), winter (cool and dry) and summer (hot and dry).

Yields of *rabi* crops such as wheat, pulses, oilseeds under irrigation can be three to four times higher than the present yields, of course, *c.i.f.* given enough fertilizers and other requisites.

Similarly, yields of such *kharif* crops as paddy and jute can also go up considerably by a judicious application of manures and fertilizers under irrigation.

## CROPPING PROGRAMME UNDER IRRIGATION

Now here are a few triple cropping programmes. See which one is best suited to your area.

*For high and medium lands*

- *Jute—transplanted *aus* paddy—*rabi* crops such as wheat, potato, mustard, gram, lentil, winter vegetables, etc.
- *Early *aus* paddy—transplanted *aus* paddy or early *aman*—*rabi* crops such as wheat, potato, mustard, gram, lentil, winter vegetables, etc.
- **Jowar* or maize for fodder—transplanted *aus* paddy—*rabi* crops such as wheat, potato, mustard, gram, lentil, winter vegetables, etc.

*For low lands*

- **Capsularis* jute —transplanted *aman* paddy—onion, maize, etc.
- *Early *aus* paddy—transplanted *aman* paddy—onion, maize, etc.

The cropping season for the triple cropping programme for upland and medium lands is roughly from April to July for the first crop, August to October for the second crop and November to March for the third crop.

For low lands, the cropping season will be April to July for the first crop, August to December for the second crop and January to April for the third crop.

## GREEN MANURE CROP A MUST

Three crops a year from the same land year after year are likely to exhaust the land. Therefore, see to it that you include a green manure crop. With the help of perennial irrigation, you will find it possible to raise a green manure crop almost any time of the year.

See which one of these suits you best.

- *Jute—transplanted *aus* paddy or early paddy—berseem for fodder and green manure.
- **Aus* paddy—cowpea or *mung* or *kalai* or *Phaseolus aureus*, etc., for green manure and fodder—*rabi* crops, such as wheat, potato, etc.
- *Green manure crop like *dhaincha* or cowpea—transplanted paddy—*rabi* crops.

## AN EXPERIMENT

A trial was conducted on an one-acre land for three years in the State Seed Multiplication Farm, Fulia, to find out the yields of each crop in a triple-cropping programme.

1958-59 : Early *aus* paddy—transplanted *aus* paddy—potato.

1959-60 : Early *aus* paddy—*kalai*—wheat.

1960-61 : Early *aus* paddy—transplanted *aus* paddy—potato.

*Satika*, a recommended *aus* paddy, was chosen. It was sown in lines and irrigation given as and when necessary.

In April and May, much more water is required under the transplanted condition than under the direct sowing. Therefore, to save on water and to bring larger areas under irrigation, the first *aus* paddy should be sown direct.

Monsoon starts from the second week of June. As most of the rainfall is confined during June to October, it is possible to transplant paddy under rainfed condition. A few extra irrigations may be required depending on the weather. It is, therefore, more economical to transplant the second paddy. It is also easier to control weeds in transplanted paddy. The variety used was again a recommended one—*Charnok*. Seedlings, four weeks old, were used for transplantation.

The following Table shows the crops raised in a year from the same land, manures and fertilizers applied, date of sowing, date of harvesting and the yield obtained from the various crop.

Thus it will be seen that fairly uniform yields of different crops were obtained over a period of three years even when 8 crops and one green manure crop were taken from the same land.

Under normal rainfed condition, such uplands produce an *aus* paddy or jute crop of about 15 maunds per acre and a *rabi* crop such as mustard, pulse or wheat of four to eight maunds per acre in a year.

## THE TRIPLE-CROPPING PROGRAMME AT FULIA

| | First crop (Early Aus paddy) | Second crop (Transplanted Aus paddy) | Third crop (Potato) |
|---|---|---|---|
| Variety | **Satika** | **Charnok** | **R.K.M.** |
| Manures and Fertilizers. | 3 tons town compost, 25 lbs. N as ammonium sulphate, 16 lbs. $P_2O_5$ as superphosphate. | 2 tons town compost, 25 lbs. N as ammonium sulphate. | 5 tons town compost, 20 mds. potato fertilizer mixture. |
| Date of sowing | 2-4-58 | 10-7-58 | 2-11-58 |
| Date of harvesting | 23-6-58- | 15-10-58 | 7-3-59 |
| Yield | 21 mds. 16 srs. | 27 mds. 23 srs. | 185 mds. |
| | | 1959-60 | |
| Manures and Fertizers. | 3 tons town compost 25 lbs. N as ammonium sulphate, 16 lbs. $P_2O_5$ as superphosphate. | 16 lbs. $P_2O_5$ as superphosphate. | 8 lbs. N. as ammonium sulphate |
| Date of sowing | 2-4-59 | 3-7-59 | 27-10-59 |
| Date of harvesting | 28-6-59 | 15-9-59 | 28-3-59 |
| Yield | 22 mds. 21 srs. | 225 mds. green matter | 28 mds. |
| | | 1960-61 | |
| Manures and Fertilizers. | 2 tons town compost, 25 lbs. N as ammonium sulphate, 16 lbs. $P_2O_5$ as superphosphate. | 2 tons town compost, 25 lbs. N as ammonium sulphate. | 5 tons town compost, 20 mds. potato fertilizer mixture. |
| Date of sowing | 10-4-60 | 30-7-60 | 10-11-60 |
| Date of harvesting | 25-7-60 | 31-10-60 | 15-3-61 |
| Yield | 24 mds. 7 srs. | 25 mds. 31 srs. | 106 mds. 10 srs. |

*India is the second largest producer of coconuts in the world, with an annual production of about* 4,150 *million nuts. Still we have to import about* 1,250 *million nuts every year to meet our internal demand.*

# SUGARCANE PROTECTS YOUR SOIL ALSO

*When you plant the cane crop, you get an additional benefit—your soil is protected from erosion*

IT is the topmost layer of the soil which contains most of the plant nutrients. Heavy rains and high velocity winds go on removing bit by bit of this top soil which results in erosion.

There are many ways to control the erosion of this top soil. One of these is to keep the land covered with grasses, legumes or other close-planted crops. Then even the heavy rains will have almost no effect on the soil as far as the erosion is concerned. These luxuriant crops will protect the soil.

Sugarcane is one such crop. It is an annual crop and stands on the soil for about 10 months if planted in spring and for 14 months if planted in autumn.

In the autumn-sown sugarcane crop, heavy rains and high velocity winds have practically no effect on the soil. By the time winter rains set in, the crop has taken a stand. And at this time farmers also usually sow an early crop of mustard, peas or gram in-between the cane rows. This extra crop besides giving an additional income helps cover the soil also.

By the time, the catch crop is harvested the field is covered with a thick foilage of the sugarcane, which itself acts as a brake for the rain and wind, thus reducing any chances of erosion due to these two factors.

In the case of the spring-sown crop, the sugarcane setts are planted in February or March and irrigated. By the time hot winds and storms set in in May or June, the crop would have taken a good stand by then with a good canopy of leaves. The leaves also act as a brake against rain and wind.

Manurial and cultural practices which are a part of sugarcane cultivation also help check erosion. The manures help absorb the rain water.

A leguminous green manure crop like *lobia* planted between the rows of sugarcane for the control of weeds also acts as a good soil cover.

Castor plants planted on the boundary of sugarcane fields also help in breaking the velocity of winds.

Thus, when you grow sugarcane, and the cultural and manurial practices which you follow for it you minimise the chance of soil erosion by wind or rain.

*The* kisan, *whether as a landless labourer or labouring proprietor, is the salt of the earth, which rightly belongs or should belong to him.*

*The moment you talk to him and he begins to speak, you will find that wisdom drops from his lips. Behind the crude exterior, you will find a deep reservoir of spirituality. I call this culture.*

*An age-old culture is hidden under an encrustment of crudness. Take away the encrustation, remove his chronic poverty and his illiteracy and you have the finest specimen of what a cultured, cultivated, free citizen should be.*

—Mahatma Gandhi

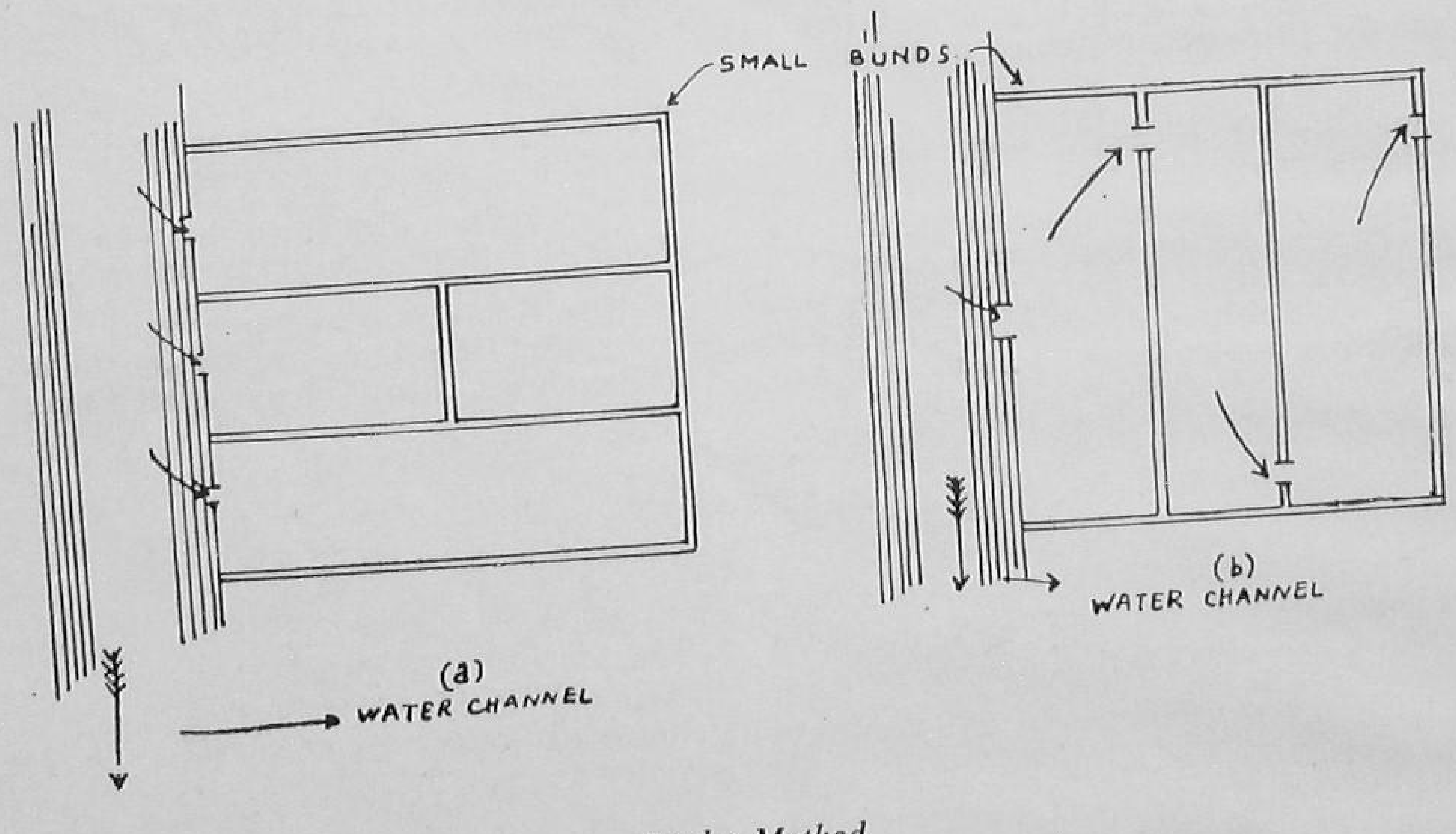
# How to control EROSION in IRRIGATED AREAS

WHENEVER water flows over bare lands it carrys away with it a certain amount of soil. As a result, erosion takes place. But, in case of irrigation water, this danger is not so much as the force of this water can be controlled.

However, in places where crops are raised on steep slopes and where they are irrigated through long, narrow steep channels, erosion always presents a problem. Here special steps like growing crops or trees on contours have to be taken to reduce the danger.

Otherwise, in irrigated areas, keeping the erosion hazard to the minimum is easy, provided, of course, you follow suitable methods of irrigation. The following methods will not only help to prevent the top-soil from washing away, but also help in proper distribution of moisture to the crops and lead to the economy in the water use.

The method you choose to apply water to the irrigated crops will differ with soils and sub-soils, topography, nature of water supply, size of the farm and the crop grown.




*Border Method*

## THE BORDER METHOD

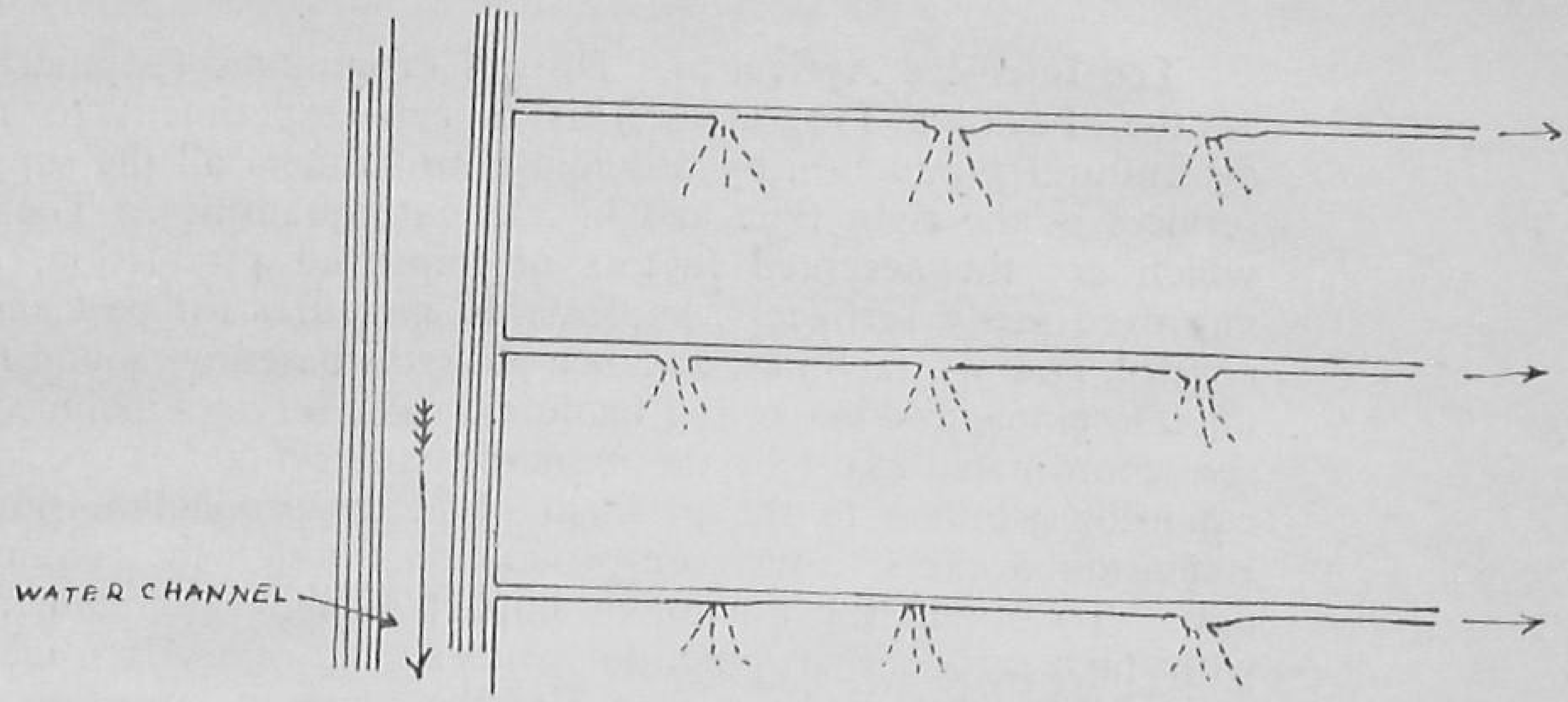
It consists in dividing a field into long narrow plots by low bunds extending in the direction of the slope, provided this slope is not steep enough to cause soil wash or restrict area under water to narrow patches. The bed of each field is level from side to side.

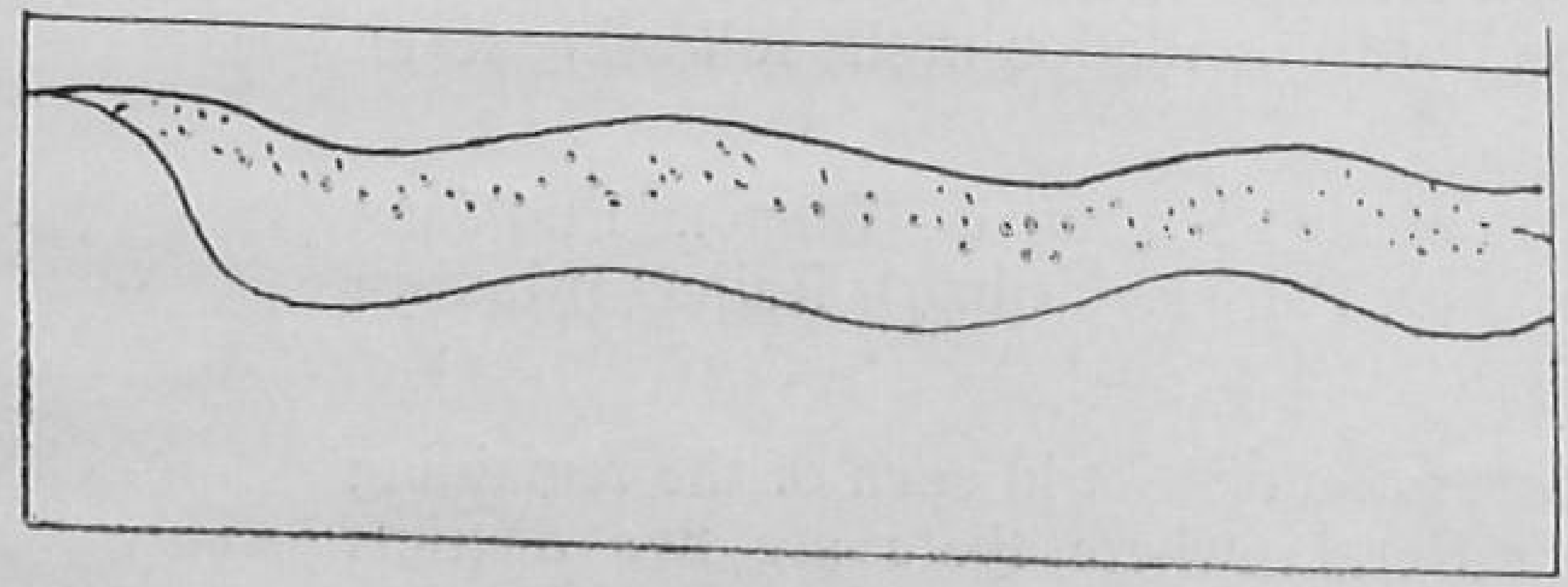
The size of the strips and the quantity of water let in would depend upon the nature of the soil and the crop. In absorptive soils, narrow widths and lengths would be required, so as to wet the soil rapidly and avoid loss by percolation.

In deep and clayey soils, a small quantity of water has to be let in over a long period of time. Therefore,

Flooding of land from field channels is another method for irrigating seasonal crops which are grown in fairly steep areas, and where the quantity of water available is small. Not much money need be spent in levelling up the land, except breaking of local high spots. This method, however, does not ensure uniform irrigation.

*Flooding Method*



*Corrugation Method*

the length of the field may be longer than in the first case.

*The Check Method*

The area under irrigation is fairly levelled and enclosed by small bunds to which water is conducted from a water channel.

This method is useful in the case of crops requiring heavy irrigation and where it is necessary to hold the water for a long time.

In certain states, there are irrigation rules prescribing sizes of bunds for different crops and the area of each plot, so that the loss of water would be minimised. This method is useful for the cost of irrigation would be less, when once the original bunds have been constructed.

*The Corrugation Method*

In this method a small flow of water is allowed to go through a series of narrow, shallow furrows or corrugations.

In steep areas, irrigation is possible by constructing what are called 'pondage banks' at intervals. These bunds may be about four feet high built on contour with surplus channels on either side, and are constructed one below the other in a ziz zag way.

A certain amount of direct irrigation is possible in addition to some sub-irrigation directly below the bunds. This method is more useful for grassland rather than for agricultural crops.

By adopting suitable irrigation methods, along with proper plantation and cultivation practices, you can control erosion to a great extent in irrigated areas.

# *News from Package Districts*

The Intensive Agricultural District Programme (popularly known as the 'Package Programme') is a new experiment to maximise agricultural production by providing our farmers all the supplies and services at the right time and in adequate quantities. The supplies, which are the accepted factors of improved production, comprise improved seeds, fertilizers, implements, measures for pest and disease control, godown facilities, advance of credit based on sound farm production plans, and marketing facilities. The services include an intensive coordinated effort by the numerous subject-matter specialists and extension workers to the problem of better production through the Extension workers to increase production through the communication aids. To obtain the maximum impact of the Programme, districts with high production potential and having irrigation facilities or assured rainfall have been chosen as the venue of operation.

The Programme was launched in 1960-61 by the Government of India in collaboration with the Ford Foundation in the following seven districts of the country:

West Godavari (Andhra Pradesh), Shahabad (Bihar), Ludhiana (Punjab), Aligarh (Uttar Pradesh), Pali (Rajasthan), Raipur (Madhya Pradesh) and Tanjore (Madras).

It has been extended to cover one district in each of the remaining States in India, excepting in Kerala where there are two districts covered by this programme.

Starting this month, we will be giving news of achievements from various Districts.

## ALIGARH

During the current year 1963-64, there has been a substantial expansion in the Programme and it is expected that it will cover 6 lakh acres. During 1961-62, about 9,000 farm plans were drawn up. This number increased to a little over 24,000 during 1962-63. The target is 1,00,000 farm plans.

### *Fertilizers*

The consumption of nitrogenous fertilizers (in terms of ammonium sulphate) increased from 1,569 tonnes in 1960-61 to 1,889 tons in 1961-62 (an increase of 20 per cent) and to 4,652 tons in 1962-63 (an increase of about 217 per cent).

### *Seeds*

During 1961-62, 4,805 quintals of improved seeds of wheat were distributed under the Programme. A total quantity of 4,687 quintals of foundation seeds was distributed during 1962-63.

### *Plant protection*

Plant protection measures were carried out over an area of about 9,311 hectares during 1961-63. This area increased to 17,187 hectares during 1962-63.

About 21 tons of pesticide formulations were distributed during 1961-62, and 68 tons during 1962-63.

In all, 1,588 hand dusters, sprayers, rat fumigation pumps and seed-treating drums were supplied during 1961-62 and 463 during 1962-63.

*Demonstrations*

The number of result demonstrations has substantially increased since the inception of the Programme. As against 107 result demonstrations laid out during *rabi* 1960-61, 964 were organized during 1961-62 and 14,773 during 1962-63. The majority of the *rabi* demonstrations related to the wheat crop.

The number of *kharif* season demonstrations rose from 381 in 1960-61 to 1,561 during 1962-63. The yields achieved on demonstration plots have been appreciably higher than those on the 'control' plots.

*Credit*

When the Package Programme was started, there were about 500 cooperative societies in the District with a membership of about 83,600, a share capital of Rs. 32.1 lakhs and a working capital of Rs. 10.6 lakhs. By the end of June, 1962, number of societies rose to 549 and the share capital to Rs. 42.0 lakhs.

About 50 per cent of the agricultural population has been brought within the fold of the cooperative movement.

An amount of Rs. 1.41 crores was given as loan by the societies during 1961-62, as against Rs. 1.37 crores during 1959-60.

## LUDHIANA

*Fertilizers*

The average consumption of fertilizers per cultivated acre increased from 8 kilograms in 1960-61 to 19 kilograms in 1961-62. These figures per irrigated acre work out to 18 kilograms and 42 kilograms in 1960-61 and 1961-62, respectively.

The increase in the consumption of superphosphate is phenomenal. It was only 916 tons during the Second Five Year Plan and 361 tons during 1960-61. In 1961-62, it shot up to 2,001 tons.

During the current year up to the end of September, 1963, about 9,000 tons of fertilizers have been sold. The target for the current year is 38,500 tons.

*Plant protection*

During the two years of the Programme. use of insecticides and pesticides has become very popular. For instance, consumption of D.D.T. and B.H.C. was only 5.26 tons during 1960-61. During 1961-62, the consumption of these insecticides rose to 6.29 tons and during 1962-63 it has gone up to 201.47 tons.

Similarly, the consumption of Endrine was 3 gallons in 1960-61, 19.70 gallons during 1961-62, and 38.60 gallons during 1962-63. Only 30 hundredweights of Agallol, Ceresan and zinc phosphide were used in 1960-61; the consumption of these pesticides during 1962-63 was 61 hundredweights.

Some 113 foot-sprayers were sold on subsidy during 1960-61, and 105 foot-sprayers, 61 spraying pumps and 84 dusting machines in 1961-62.

Some 600 pounds of 2, 4-D weedicide were used during 1961-62 against 60 pounds in 1960-61. During 1962-63, the amount used was 1,200 pounds. were used.

*Soil tests*

The existing Agricultural College Laboratory, and the I.A.D.P. Soil Testing Laboratory are facilitating the testing of soil samples on which fertilizer recommendations are being made. It is proposed to test 30,000 samples during the current year.

*Agricultural implements*

It is proposed to saturate the District with improved implements so that there should be no farmer who does not possess at least an iron plough and a pneumatic-tyred cart. Under this programme, 11,350 ploughs and 18,710 other implements were supplied for the first time during 1961-62. Large quantities of improved agricultural implements were also sold by fabricators.

As a result of this campaign, at present practically every farmer has an iron stirring plough. The iron ploughs are now being sold at 50 per cent subsidy to popularize furrow turning ploughs.

*Scientific demonstrations*

Demonstrations on farmers' fields prove very effective in convincing them to adopt new practices and techniques which are advocated by the Agriculture Department.

During 1961-62, some 3,494 demonstrations were laid in the District. The results of these composite demonstrations are encouraging.

The yields have stepped up from 16 to 36 per cent in the case of cotton, 22 to 43 per cent in per cent in wheat and 15 to 57 per cent in the case of sugarcane.

*

TANK-BEDS

(*From page 10*)

and *Kolinji* (*Tephrosia purpurea*) when the water recedes and there is enough moisture in the soil.

Even if the water is received in the tanks when these crops are still there will be mature enough to plants withstand water stagnation for a short while and will be ready for pulling out when the fields are being prepared for planting.

*Daincha* and *Sesbania speciosa* can stand in water even up to about a month. One can collect seeds from the green manure crops raised in tank-beds and earn an additional income as there is a good demand for green manure crop.

Hence, there is no reason why these valuable lands should be left unused when there is a need for utilizing every bit of land for increasing agricultural production.

---

COCONUTS

(*From page 16*)

Form small sand mounds of about two feet height at regular intervals giving a spacing of 20 feet. Plant coconut seedlings on them.

Widen the sand mounds every year with a mixture of lake silt and sand.

Convert the bund to a regular raised strip of land by the time the trees start bearing.

PRACTISE UNDERPLANTING

Underplanting in existing coconut garden is best started when the trees show a marked decline in yield.

Manure the underplanted seedlings properly to give them a good start.

Plant only good quality seedlings.

USE QUALITY PLANTING MATERIAL

Choose good seedlings from selected mother palms.

Good seedlings are vigorous, possessing a large number of leaves with short and thick petioles, good girth at the base and large number of roots.

Nine to 18-month old seedlings are the best for planting.

Obtain quality seedlings from the Government Coconut Nurseries.

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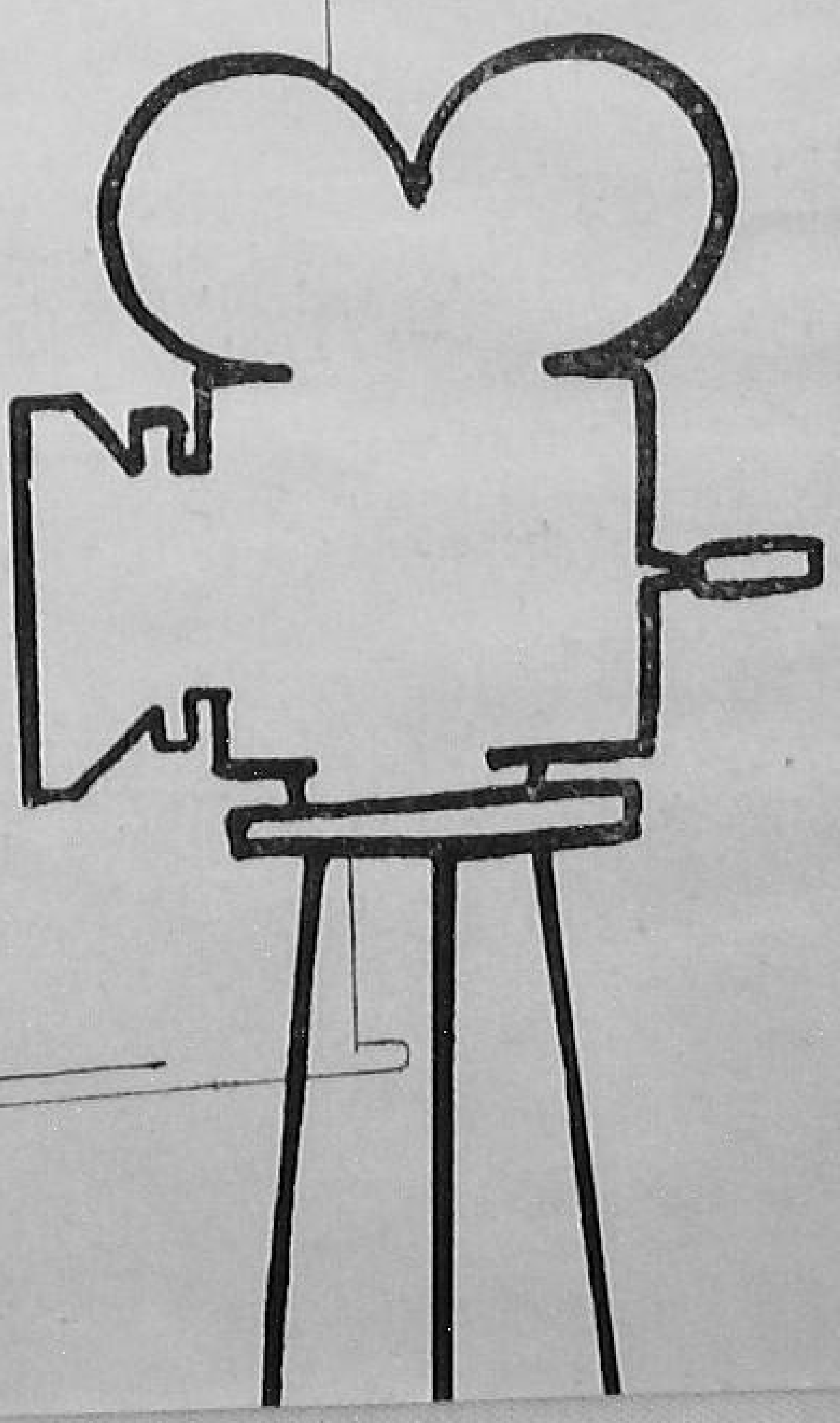
# FILMS

Films and filmstrips are good Extension aids. If you want to borrow them for use in your teaching or field work, the Farm Information Unit of the Directorate of Extension is at your service.

The Unit maintains a library of films and filmstrips on agriculture and Home Science subjects.

The films are given on loan, free of charge, to the members of the library. Membership is free.

For details regarding membership and the films and filmstrips available, write to the Librarian, Farm Information Unit, Directorate of Extension, Krishi Bhavan, New Delhi.



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## "There's a word for service," *said Tata*

"Impeccable ... smooth ... prompt,"
*suggested Fison.*

"No, no," *said Tata.*

"Quiet ... personal ... careful," *offered Ralli.*

"Got it!" *said Tata, a gleam in his eye.*
"Integrated!"

*Fison and Ralli agreed. Tata had a way with words.*

*Together they said,* "We offer the farmer an integrated service. The finest range of fertilizers and pesticides in India. And what's more, we advise him on their use."

"A comprehensive service," *said Ralli.*

"A complete service," *said Fison.*

"An integrated service," *said Tata.*

Tata-Fison and Rallis have combined their separate marketing organisations into a single, unified service. For the future, all Tata-Fison products will be marketed by Rallis' Fertilizer and Pesticides Division. The merger will prove of immense benefit to the Indian farmer. For the first time, one integrated service will provide advice and products covering both crop growth and crop protection throughout the country... a notable contribution to the cause of agricultural progress.

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TFRY-5

Published by the Director, Farm Information Unit, Directorate of Extension, Ministry of Food & Agriculture, Krishi
New Delhi and Printed by the Manager,